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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,786	11/03/2005	Hindrik Willem De Vries	2602-0009	1486

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EXAMINER

BURKHART, ELIZABETH A

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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01/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,786

Applicant(s)

DE VRIES ET AL.

Examiner

Elizabeth A. Burkhart

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-48 are pending in this application. Amended claims 1, 6, 16, 27-31, 36, 39, 45, and 46 are noted. The amendment filed 10/25/2007 has been entered and carefully considered. In view of said amendment the 35 USC 112 rejections have been withdrawn.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-11, 14-25, 28-34, 36-43, 47, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632).

De Vries ('632) discloses a method for generating an atmospheric glow discharge plasma wherein a plurality of electrodes are arranged defining a discharge space and AC voltage is applied to those electrodes. A gaseous substance (nitrogen) is provided in said discharge space (Col. 3, lines 20-60) and the AC-voltage has a frequency range of 100 Hz to 300 kHz (Claim 1). The temperature of the nitrogen gas is lower than 100°C (Col. 2, line 35). The concentration of oxygen in the nitrogen/oxygen mixture is less than 24 % (Col. 3, line 35), thus the oxygen concentration is adjustable up to 24 %. Oxygen is added to the nitrogen gas in a concentration of less than 20 vol% (Table 1). The gas flows through the discharge space having a flow rate of 20 l/min (Col. 5, line 44). At least one of the electrode is covered with a dielectric film having a thickness in a range of 0.3-5 mm (300-5000 µm) (Col. 3, line 53). The distance between

electrodes is 1-6 mm (1000-6000 μm) (Col. 4, line 20). De Vries ('632) also discloses an apparatus having the above features (Fig. 1).

Regarding Claim 1, de Vries ('632) discloses AC frequencies of 100 Hz to 300kHz. However, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention by applicant if the overlapping portion of the AC frequency range disclosed by the reference were selected because overlapping ranges have been held to be a prima facie case of obviousness, see *In re Worthheim* 191 USPQ 90.

Regarding Claims 1 and 28, De Vries ('632) does not explicitly disclose controlling the amplitude of the AC-voltage to be dependent upon the breakdown voltage of the gaseous substance. However, the specification discloses that the breakdown voltage is characteristic of the carrier gas being used (p. 11, lines 8-12) and in Example 2, nitrogen is supplied as the carrier gas at an amplitude of 4.5 kV. Since De Vries ('632) discloses using nitrogen gas at an amplitude of 3-5 kV (Table 2), the endpoint of 5 kV would at least meet the limitation of maintaining (controlling) an amplitude to be at least equal to the breakdown voltage of the nitrogen gas, thus inherently reducing the temperature applied to the substrate and preventing thermal damage to the substrate, especially since De Vries ('632) is using the same substrate material (TAC, PET, or PEN (Col. 2, lines 56-60)) as the present invention.

Regarding Claims 2, 3, and 29, de Vries ('632) does not explicitly disclose applying an AC-voltage to said electrodes having an amplitude less than or equal to 140 % of said breakdown voltage, more preferably 110-120 % of said breakdown voltage.

However, de Vries ('632) does disclose that the amplitude of the AC-voltage is 3-5 kV (Table 2) and the specification states that for nitrogen, argon, and air the desired voltages are in the range of 1-6 kV (p. 15, line 15). Also, as discussed above, in Example 2 nitrogen gas is applied at an amplitude of 4.5 kV. Thus, it would have been obvious that at least a portion of the range of amplitudes taught by de Vries ('632) would be within the claimed ranges of the breakdown voltage.

Regarding Claim 4, De Vries ('632) discloses that air or nitrogen is supplied at atmospheric conditions (Col: 2, lines 34-36), wherein atmospheric conditions is being interpreted to mean standard temperature, which is lower than 100°C.

Regarding Claim 6, De Vries ('632) does not disclose providing the further gas to the discharge space after stabilizing the plasma wherein the concentration of said further gas is increased stepwise and the plasma is stabilized after each stepwise increment. However, it would have been obvious to one of ordinary skill in the art to use the method of de Vries ('632) wherein the oxygen is added in stepwise increments and the plasma is stabilized after each increment because it is merely a design choice whether to add the total oxygen concentration to the nitrogen at once and stabilize the plasma or to add the oxygen concentration gradually and stabilize the plasma in steps, especially since both methods result in a plasma with good stability.

Regarding Claims 16, 18, 19, 38, and 39, de Vries ('632) does not explicitly disclose choosing a residence time or choosing the amplitude of the AC-voltage in order to keep the polymer film below its glass transition temperature. However, de Vries ('632) does disclose that the film may be moved at speeds that far exceed the speeds known

in the art (Col. 2, lines 18-20), resulting in short exposure periods (residence time) to the plasma such as 0.01-10 seconds (Col. 4, lines 58-60). De Vries ('632) also discloses an amplitude of the AC-voltage, wherein the amplitude is within a certain percentage of the breakdown voltage as discussed above, and that the polymer film is TAC, PET, or PEN (Col. 2, lines 56-60). Thus, the process conditions of de Vries ('632), being in the same ranges as the instant application, would result in the temperature of the polymer film being kept below its glass transition temperature, preventing thermal degradation of the film.

Regarding Claims 25 and 43, the specification discloses that the voltage rise time is dependent on the frequency and the amplitude of the AC-voltage and is influenced by the thickness of the dielectric material (p. 19, lines 20-24). De Vries ('632) discloses a frequency and amplitude of the AC-voltage and a thickness of the dielectric film in the claimed ranges, thus de Vries ('632) would inherently teach a voltage rise time in the claimed range.

Thus, claims 1-11, 14-25, 28-34, 36-43, 47, and 48 would have been obvious within the meaning of 35 USC 103 over the teachings of de Vries ('632).

3. Claims 12, 13, 27, 35, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Gherardi et al ('948).

De Vries ('632) does not disclose the gas velocity or that the plasma generated may be used for a CVD process.

Gherardi ('948) discloses a method and apparatus for generating an atmospheric glow discharge plasma wherein the gas velocity is up to 10 m/s (Col. 2, line 53) and that the surface treatment may be a CVD process to deposit a coating (Col. 7, lines 37-55).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to incorporate the gas velocity as suggested by Gherardi ('948) into the process of de Vries ('632) because it would be a suitable gas velocity for an atmospheric glow discharge plasma process involving polymer films. Also, it would have been obvious to use the plasma generated de Vries ('632) for a CVD process as evidenced by Gherardi ('948) because it is a suitable plasma to deposit a coating onto a polymer film.

Thus, claims 12, 13, 27, 35, and 46 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Gherardi ('948).

4. Claims 26 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Yuasa et al ('377).

De Vries ('632) does not disclose a current density through the plasma of less than 10 mA/cm².

Yuasa ('377) discloses a current density used in a glow discharge plasma treatment process in a range of 0.2-300 mA/cm² in order to produce a uniform discharge plasma with desirable treatment results (Col. 5, lines 37-40). When the surface treatment is applied to a low melting point material such as polymer materials is typically in a range of 1-200 mA/cm² (Col. 6, lines 48-60).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant use the current density as suggested by Yuasa ('377) in the process of de Vries ('632) in order to maintain a uniform glow discharge plasma when treating the surface of a polymer material.

Thus, claims 26 and 44 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Yuasa ('377).

5. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Roth et al ('324).

De Vries ('632) does not disclose using a current choke coil to stabilize the plasma.

Roth ('324) discloses generating an atmospheric glow discharge plasma wherein the plasma is stabilized with a current choke coil (Col. 2, lines 51-53, Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use a current choke coil as suggested by Roth ('324) in the process of de Vries ('632) in order to create a stable and uniform atmospheric glow discharge plasma.

Thus, claim 45 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Roth ('324).

Response to Arguments

6. Applicant's arguments filed 10/25/2007 have been fully considered but they are not persuasive. Applicant argues that in Col. 2, line 35 of De Vries ('632) there is no disclosure that states the temperature of nitrogen gas is lower than 100°C. The

examiner disagrees. At Col. 2, line 35, De Vries ('632) discloses that nitrogen is supplied at atmospheric conditions, wherein atmospheric conditions has been interpreted to mean standard temperature, which is lower than 100°C.

7. Applicant argues that De Vries ('632) does not disclose any relationship between the amplitude of the AC-voltage and breakdown voltage of a supplied gas for any reason and nothing suggests such a relationship could be a basis for controlling temperatures within the discharge space to prevent thermal damage to the substrate. While De Vries ('632) does not explicitly disclose a relationship between the amplitude of AC-voltage and the breakdown voltage, De Vries ('632) does disclose supplying nitrogen at an amplitude of 3-5kV (Table 2) and the present invention discloses supplying nitrogen at an amplitude of 4.5 kV (Example 2). Thus, the amplitudes taught by De Vries ('632) would inherently reduce the temperature applied to the substrate and prevent thermal damage to the substrate, especially since De Vries ('632) is using the same substrate material (TAC, PET, or PEN (Col. 2, lines 56-60)) as the present invention. The mere observation of still another beneficial result of an old process cannot form the basis of patentability. *Allen et al. v. Coe*, 57 USPQ 136; *In re Maeder et al.* 143 USPQ 249.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth A. Burkhart whose telephone number is 571-272-6647. The examiner can normally be reached on M-Th 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

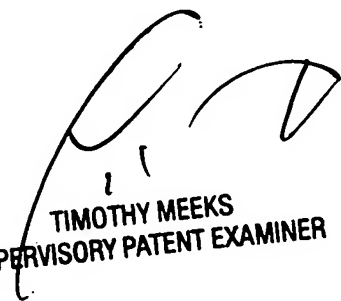
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eab



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER